Dalton's Concept

- Atom is smallest particle of Matter (S, L, G)
- Atom is Homogeneous and indivisible in nature

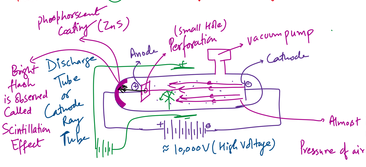
But in Reality Atom is Heterogeneous and composed of sub-atomic particles.

1 amu = 1.66 × 10⁻²⁴ g

1 amu = $m_p \approx m_n$ = 1837 m_e

	Symbol	Charge	mass	Discoverer
Electron (e^-)	$_{-1}e^0$	-1.6×10^{-19} C	9.1×10^{-28} kg	JJ Thomson
proton (H^+ or p)	$_1H^1$ or $_1p^1$	$+1.6 \times 10^{-19}$ C	1.6725×10^{-27} kg	Eugen Goldstein
Neutron (n)	$_0n^1$	no charge	1.6744×10^{-27} kg	James Chadwick

1.6725×10^{-24} g



1 bar = 10^5 Pascal (Pa)

1 atm ≈ 1 bar

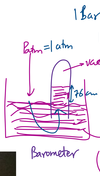
1 Pa = 1 N/m²

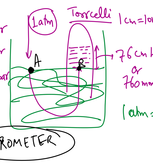
1 mmHg = 1 torr

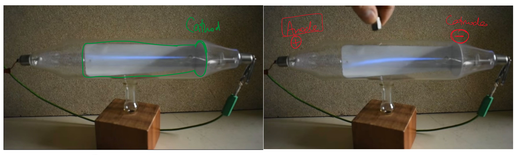
10^5 Pa = 1 bar

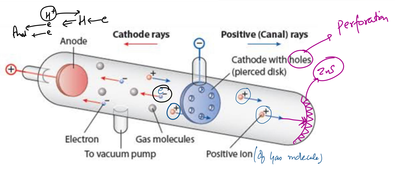
1 atm ≈ 1 bar

1 atm = 1.01325 bar



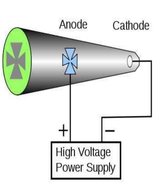


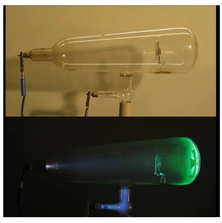


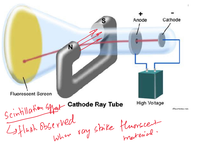


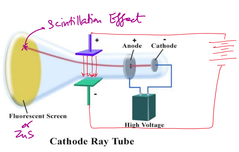
$\frac{q_{H^+}}{m_{H^+}} = 9.57 \times 10^7$ C/g

$\frac{q_{He^{2+}}}{m_{He^{2+}}} = 2.38 \times 10^7$ C/g





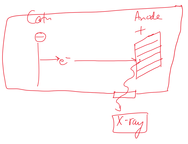




9.576×10^7 C/g

Properties of Cathode Rays

1. Cathode Rays originate from Cathode and move in straight line towards anode in absence of external Electrical or magnetic field.
2. In presence of external E.f and M.f, deflection in path of Cathode rays will be observed.
3. Cathode rays is stream of -ve particles (electrons)
   "electron" term is coined by STONEY.
4. Cathode rays show Mechanical Effect (rotate light Paddle wheel)
5. Cathode rays show Heating Effect
6. Cathode rays generate X-Rays when strike with metal.
7. Cathode rays cast shadow of material falling in their path.
8. Specific Charge of Cathode ray particle (electron) was calculated by J.J. Thomson & which is equal to 1.758820×10^{11} C/kg
9. Cathode Ray is independent of nature of material of electrode and nature of Gas.
   $\left(\frac{e}{m_e}\right) = 1.758820 \times 10^{11}$ C/kg = Specific Charge of Cathode ray particle
10. Cathode Ray particle (electron) is BASIC Constituent of all matter. because of constant specific charge



PROPERTIES OF ANODE RAYS

1. Observed & studied by E. Goldstein.
2. Anode Ray composed of +ve gaseous ions
   - formed by collision of e^- with gas molecules or
   - formed by ionization of gas by Cathode Ray particles.

If gas is H_2 → Anode Particle is H^+ (proton)

Specific Charge of proton is highest among all the ions.

$\frac{q}{m} = \frac{e}{m_p} = 9.574 \times 10^7$ C/g

If gas is He, we can observe more than one kind of Anode Ray Particle i.e. He^+, He^{2+}

$m_H = 1$ amu or $\approx m_p$

$m_{He} = 4$ amu $= 4m_p$

$m_{He^+} = (4\text{amu}) \rightarrow (n_p + n_n)$ amu

$m_{He^+} = 4$ amu

$m_{H^+} = 1$ amu

$\frac{q_{He^+}}{m_{He^+}} = \frac{e}{4 \times m_p}$

$\frac{2e}{4m_p} = \frac{q_{He^{2+}}}{m_{He^{2+}}}$

So, Anode Ray Depends on Nature of Gas.

3. Anode Rays also travel in straight line like Cathode Ray in absence of External E.f & M.f
4. Anode Ray also show Mechanical Effect
5. Anode Ray also called CANAL Rays / Channel Rays.
6. Anode Rays do not originate from Anode. They are produced in b/w Cathode & Anode.